

Claims

- [c1] 1. A process for making a fertilizer complement, wherein an organic vegetal growth stimulator is obtained from *Ulva* and *Macrocystis* algae, comprising the steps of acidifying the *Macrocystis* with an acidifying agent, and digesting the acidified *Macrocystis* and the *Ulva* with an alkalinizing agent.
- [c2] 2. The process according to claim 1, wherein the growth stimulator comprises auxin-type and cytokinin-type phytohormones.
- [c3] 3. The process according to claim 1 wherein the *Ulva* algae comprises *Ulva rigida* and the *Macrocystis* comprises *Macrocystis pyrifera*.
- [c4] 4. The process according to claim 1, wherein the acidifying agent comprises 0.2 N hydrochloric acid.
- [c5] 5. The process according to claim 1, wherein the alkalinizing agent is potassium carbonate (K_2CO_3).
- [c6] 6. The process according to claim 1, comprising the steps of:
 - 1) receiving fresh algae *Macrocystis* and receiving algae

Ulva,

- 2) grinding the alga *Ulva*,
- 3) weighing the fresh *Macrocystis* and *Ulva* algae,
- 4) washing the fresh *Macrocystis* in water,
- 5) mincing the washed *Macrocystis*,
- 6) treating the minced *Macrocystis* with an acidifying agent,
- 7) draining the residual liquid and separating the solid, minced *Macrocystis*,
- 8) optionally washing the solid, minced *Macrocystis* with cold water,
- 9) optionally grinding the washed *Macrocystis*,
- 10) digesting the freshly ground *Macrocystis* with a potassium carbonate solution under stirring and admixing the dry ground *Ulva*,
- 11) adjusting the pH of the digested mixture to acidic with phosphoric acid,
- 12) filtering the digested mixture;
- 13) optionally storing the filtered solution for 1 to 2 days, and
- 14) optionally packaging the resulting product in plastic containers.

[c7] 7. The process according to claim 6, wherein the weight ratio of the *Macrocystis* to *Ulva* is 1:1.

- [c8] 8. The process according to claim 7, wherein the weight ratio of *Macrocystis* to *Ulva* is up to 10:1 when the *Ulva* is in a dried state.
- [c9] 9. The process according to claim 7, wherein the step of washing results in a low electric conductivity in the washed *Macrocystis*.
- [c10] 10. The process according to claim 6, wherein the step of grinding the *Ulva* reduces the size to about 0.2 mm.
- [c11] 11. The process according to claim 6, wherein the particle size of the *Macrocystis* in step 5) is about 1 cm and in step 9) is about 0.4 cm.
- [c12] 12. The process according to claims 4, wherein the ratio are: water (200 L): *Macrocystis* (100 kg): 0.2 N HCl (2,5 l).
- [c13] 13. The process according to claim 12, wherein the acid treatment is carried out with 0.2N hydrochloric acid during 30–40 min at 50°C with constant stirring.
- [c14] 14. The process according to claims 5 and 6, characterized in that the ratio are: water (400 l): algae mixture (200 kg): K_2CO_3 (2 kg).
- [c15] 15. The process according to claim 14, characterized in that the alkaline treatment is carried out with K_2CO_3 during 2 hours at 65 ± 5 °C with constant stirring.

- [c16] 16. The process according to claim 15, characterised in that the digestion achieves a pH value of about 10 ± 0.2 , allowing to obtain high extraction yields of potassium alginate.
- [c17] 17. The process according to claim 6, wherein the final pH value of the product must be regulated with technical degree phosphoric acid (H_3PO_4).
- [c18] 18. The process according to claim 14, wherein the final pH value of the product is about 4.5 and 6.2 in order to achieve a better stabilisation.
- [c19] 19. The process according to claim 6, characterized in that the final product must be filtered through a plate and frame press-filter using as filtration media cellulose covers.
- [c20] 20. A fertilizer complement obtained by the process of claim 1.
- [c21] 21. The fertilizer complement according to claim 20, further comprising mineral elements, aminoacids, vitamins and auxin- and cytokinin-type phytohormones based on the marine algae *Ulva* and *Macrocystis* contributions.